IN THE CLAIMS

Please amend the claims as follows:

1. (currently amended) A microfluidic device for ~~significantly~~ reducing sample dispersion and cross-contamination, comprising:

a microchannel system disposed on a substrate, the microchannel system comprising at least two microchannels joined together to form a junction at their intersection ~~and means for introducing fluid into the microchannels~~, wherein at least one of the microchannels has a reduced effective cross-sectional area proximate the junction~~, and wherein the reduced effective cross-sectional area of the microchannel~~ that is less than the cross-sectional area of the junction.

2. (currently amended) The device of claim 1, wherein the reduced effective cross-sectional area extends from the junction into the microchannel a distance of from about 0.5 to 4 microchannel widths.

3. (original) The device of claim 1, wherein the reduced effective cross-sectional area comprises a porous material disposed in the microchannel.

4. (original) The device of claim 1, wherein the reduced effective cross-sectional area comprises structures disposed in the microchannel.

5. (original) The device of claim 1, wherein the reduced effective cross-sectional area is about 10% that of the cross-sectional area of the microchannel.

6-9 (canceled)

10. (currently amended) A device for reducing sample dispersion and cross-contamination, comprising:

a first and a second microchannel disposed on a substrate and intersecting to form a junction, wherein at least one of said first and second microchannels has a region of reduced effective cross-sectional area proximate the junction~~; and~~

~~means for introducing fluid into the microchannels~~.

11. (currently amended) The device of claim 10, wherein the reduced effective cross-sectional area extends from the junction into the microchannel a distance of from about 0.5 to 4 microchannel widths.

12. (original) The device of claim 10, wherein the reduced effective cross-sectional area comprises a porous material disposed in the microchannel.

13. (original) The device of claim 10, wherein the reduced effective cross-sectional area comprises structures disposed in the microchannel.

14. (original) The device of claim 10, wherein the reduced effective cross-sectional area is about 10% that of the cross-sectional area of the microchannel.

15-18 (canceled)

19. (currently amended) A device for eliminating sample dispersion at microchannel junctions, comprising:

a first and a second ~~microchannel "Y"~~ branching junction, ~~disposed on a substrate and joined at their base to form a junction, wherein at least one of the branches or arms extending from the junction of said first and second microchannel "Y" is provided with a region of reduced effective cross-sectional area proximate the junction;~~ wherein each branching junction has one inlet channel and two outlet channels and wherein the inlet channels of said first and second branching junctions are joined together to form a junction and wherein each of the outlet channels is provided with region of reduced cross-sectional area proximate the junction; ~~and~~

~~means for introducing fluid into the microchannels~~.

20. (currently amended) The device of claim 19, wherein the region of reduced cross-sectional area extends from the junction into the microchannel a distance of from about 0.5 to 4 microchannel widths.

21. (original) The device of claim 19, wherein the reduced effective cross-sectional area comprises a porous material disposed in the microchannel.

22. (original) The device of claim 19, wherein the reduced effective cross-sectional area comprises structures disposed in the microchannel.

23. (original) The device of claim 19, wherein the reduced effective cross-sectional area is about 10% that of the cross-sectional area of the microchannel..

24-27 (canceled)

28. (currently amended) A method for controlling sample dispersion and cross contamination of microchannels, comprising:

providing a microchannel system, the microchannel system comprising;

a substrate having at least two microchannels disposed thereon, wherein the microchannels intersect to form at least one junction, ~~and means for introducing fluid into the microchannel system~~; and

modifying at least one microchannel to produce at least one region of reduced cross-sectional area proximate the junction.

29. (original) The method of claim 28, wherein said step of modifying includes reducing the geometric cross-sectional area, filling the microchannel with a porous material, or packing the microchannel with structured particles.

30. (new) A method for reducing mass transport by diffusion, comprising:

providing at least two spaced apart regions of reduced cross-section within a microchannel.

31. (new) A microfluidic device for reducing sample dispersion and cross-contamination, comprising:

a microchannel system comprising at least two microchannels joined together to form a junction at their intersection, wherein at least one of the microchannels has a cross-sectional area that is less than the cross-sectional area of the junction.